

Briefing Paper - Proposed Changes to the Bay Delta Water Quality Control Plan for the San Joaquin River and South Delta

Purpose and Background

This paper outlines potential EPA actions following the California State Water Resources Control Board's (Board) proposed new and revised water quality standards to improve water quality and protect beneficial uses on the Lower San Joaquin River and South Delta. The Board's proposal was released on 12/31/12 as proposed changes to the Bay Delta Water Quality Control Plan (WQCP). The proposal includes a *narrative objective* for aquatic life, a modification to a numeric salinity objective, and flow requirements to be administered through a *Program of Implementation*. On 03/28/13, EPA sent a detailed comment letter to the Board expressing serious concerns that the narrative objective would be unenforceable, and that the proposed flows, expressed as percentage of *unimpaired flow* (UF) would be too low to provide essential ecological functions and to protect the most sensitive beneficial uses in the Bay Delta, including migratory fishes. This unimpaired flow approach is new to California and will likely be how the State articulates upcoming flow criteria for Delta Outflow as well.

Upcoming Decision Points

The Board is scheduled to issue a revised draft in April 2014, and would consider this document for adoption by the end of 2014 or the beginning of 2015. Given recent talks with technical staff and managers at the Board, we expect the revised draft will be similar to the original draft and not address our concerns. Final adoption of the revisions to the water quality standards in Water Quality Control Plan will trigger EPA's review and approval authority per CWA §303(c)¹. In turn, EPA will have 60-days to approve or 90-days to disapprove the subject WQS. The Board's adopted WQS revisions would remain in effect, even if disapproved by EPA, until the Board revises the WQS or EPA replaces the WQS under a formal rule-making process. In 1991, EPA disapproved the Board's WQCP as being inadequately protective of the designated uses and promulgated salinity standards ("X2"). Ultimately, the Board adopted comparable standards in 1995, which were approved by EPA and remain largely in effect today.

EPA's Findings about the proposed revisions to the Water Quality Control Plan

- The narrative objective should apply year round (proposed February to June) and replace vague language with measurable performance targets.
- The proposed average 35% UF reflects nearly *status quo* conditions, (~33% UF at the edge of the Delta, i.e. Vernalis - see map below) which do not protect native and migratory fishes and are known to contribute to declining populations.
- The Program of Implementation calls for a poorly defined entity, the Coordinated Operations Group, to adaptively manage UF at a range of 25-45% (an average of 35% UF) on the three tributaries; measured at the confluence of each tributary with the Lower SJR.
- The adaptive management flow range (25-50% UF is too narrow as proposed. USFWS recommends that UF reach 97% in dry/critically dry years.
- The proposed flow objectives are dramatically lower than comparable standards elsewhere.

¹ 40 CFR Part 131.21

² Current Criteria in the 2006 WQCP for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary "*Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook*"

- The proposed flow objectives would not support: (i) the *doubling objective*² for salmon; (ii) viable salmon populations; nor (iii) all life stages of fish assemblages. Populations of fall-run salmon and steelhead are at risk.

Ex. 5 - Deliberative

pre-decisional

salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.” Since enactment of that goal by the State populations have continued to erode rather than improve.

³EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards
http://www.epa.gov/region10/pdf/water/final_temperature_guidance_2003.pdf

Board's Proposal
<p>Narrative Standard (<i>proposed for only Feb-June</i>) <i>Maintain flow conditions from the San Joaquin River Watershed to the Delta at Vernalis, together with other reasonably controllable measures... sufficient to support and maintain the natural production of viable native...fish populations migrating through the Delta. Flow conditions that reasonably contribute toward maintaining viable native migratory San Joaquin River fish populations include...flows that mimic the natural hydrographic conditions to which native fish species are adapted, including the relative magnitude, duration, timing, and spatial extent of flows as they would naturally occur. Indicators of viability include abundance, spatial extent or distribution, genetic and life history diversity, migratory pathways, and productivity.</i></p>
<p>Flow Requirements for the Narrative Objective 35% of the unimpaired flow (UF) (FEB-JUN) required at the mouths of the three tributaries (i.e., Stanislaus, Merced, and Tuolumne rivers) as a 14-day running average.</p>
<p>Base and Pulse Flows 1,000 cfs baseflow at Vernalis (FEB-JUN and OCT). No baseflow will be required at Vernalis during the remaining six months of the year.</p>

Ex. 5 - Deliberative

⁴ The flows proposed by the Board in the draft SED were not protective enough to support existing biocriteria designed to double salmon populations above a baseline established from population estimates (1967-1991). Current Criteria in the 2006 WQCP for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: *"Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law."*

⁵ California Department of Fish and Game, November 23, 2010, Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta (CDFG Flow Criteria), p. 105

⁶ State Water Resources Control Board, 3 August 2010, Development of Flow Criteria for the Sacramento- San Joaquin Delta Ecosystem Prepared Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009, (2010 10 Flows Report), available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rot080310.pdf

Board's Proposal
<p>Adaptive Management The total amount of flow in the FEB-JUN timeframe range from 25% to 45% UF would be “adaptively managed” by agencies and water users, with the approval of the State Water Board’s Executive Officer within years, and across years.</p>
<p>Temperature None proposed.</p>
<p>Biocriteria None proposed.</p>
<p>Floodplain Inundation None proposed.</p>
<p>Irrigation Water Existing numeric criteria for electrical conductivity/salinity designed to protect agricultural uses will be relaxed from 0.7 dS/m (APR-AUG) and 1.0 dS/m (SEPT-MAR) to 1.0 dS/m in all months at Vernalis plus three compliance points in the South</p>

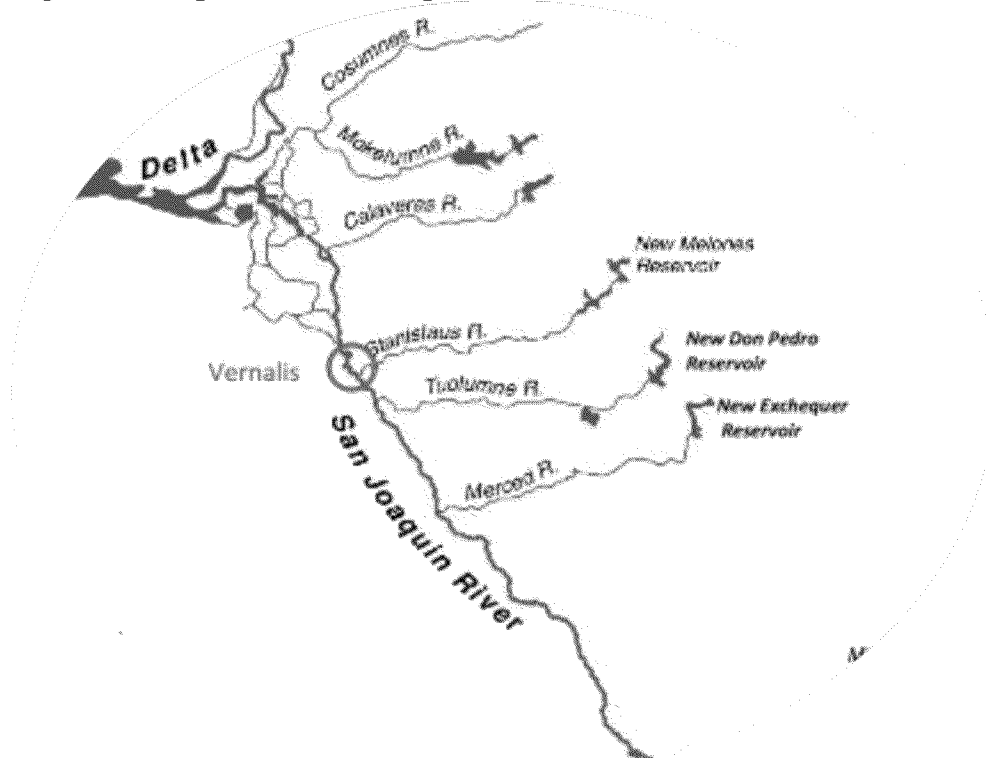
Ex. 5 - Deliberative

⁷ CDFG Flow Criteria, p. 106

Delta.	
--------	--

pre-decisional

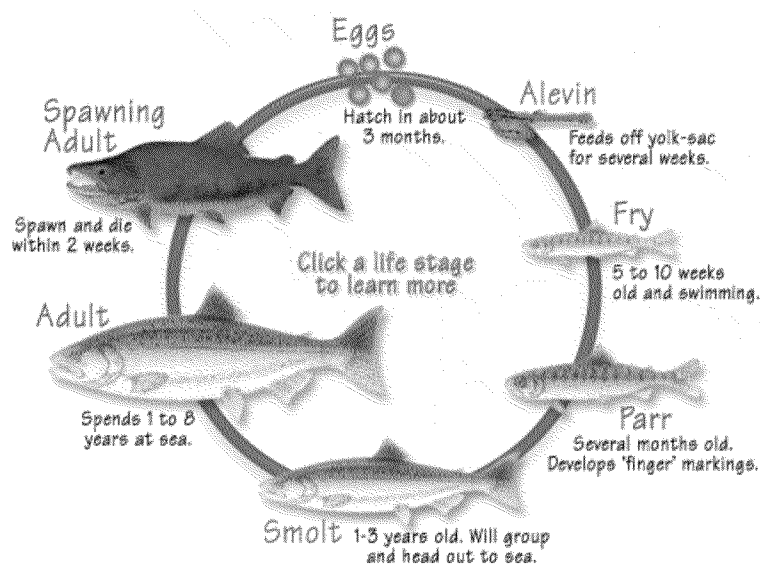
Figure 1. Map of the San Joaquin River Basin and Delta



The proposed new and revised water quality standards impact the Lower San Joaquin River (below Merced), the three major tributaries (Merced, Tuolumne and Stanislaus Rivers) below the three major dams and the Southern Delta. The Delta begins at the town of Vernalis (circled in red above).

Figure 2. Salmon Life History

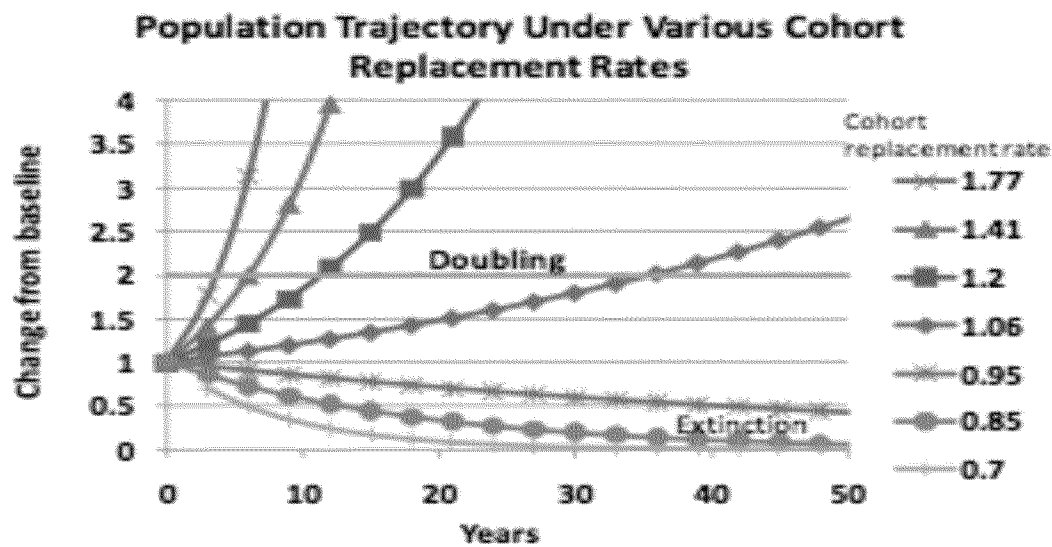
Figure from <http://library.stjosephsea.org/salmon.htm>



Salmon require different temperatures during different life stages and each life stage occurs in particular stretches of the rivers.

Figure 3. Cohort Replacement Rates and for Chinook Salmon

Figure from US DOI. 2011. Testimony to SWRCB. February 8, 2011



The Cohort Replacement Rate (CRR) is a parameter used to describe the number of future spawners produced by each spawner and is thus a measure of whether the population is increasing or decreasing. This spawner-to-spawner ratio is defined as the number of naturally produced and naturally spawning adults in one generation divided by the number of naturally spawning adults (regardless of parentage) in the previous generation. As such, the ratio describes the rate at which each subsequent generation, or cohort, replaces the previous one, and can be described as a natural CRR. When this rate is 1.0, the subsequent cohort exactly replaces the parental cohort and the population is in equilibrium, neither increasing nor decreasing. When the rate is less than 1.0, subsequent cohorts fail to fully replace their parents and abundance declines. If the ratio is greater than 1.0, there is a net increase in the number of fish surviving to reproduce naturally in each generation and abundance increases.⁸ Typical Chinook salmon growth rates are steeper than shown on this graph and have a CRR of ~8.8⁹. Currently, the CRR estimated for the Stanislaus River is less than 0.2; anything less than 1.0 is trending towards extinction.

⁸ This description is excerpted from the August 2008 Biological Assessment on the Continued Long-term Operations of the Central Valley Project and the State Water Project https://www.usbr.gov/mp/cvo/OCAP/sep08_docs/OCAP_BA_005_Aug08.pdf

⁹ Quinn, TP. 2005. The behavior and ecology of Pacific salmon and trout. Bethesda, Maryland: American Fisheries Society as cited in Table 1, pp 10 in Williams, G. J. 2010. Life History Conceptual Model for Chinook salmon and Steelhead. DRERIP Delta Conceptual Model. Sacramento (CA): Delta Regional Ecosystem Restoration Implementation Plan. http://www.dfg.ca.gov/ERP/drerip_conceptual_models.asp

Table 1. Biocriteria Proposed by NGOs with USFWS and CDFW input

Type	No	Part	What?	How Much? *	When?
Life History	1	a	Fry Timing	Maintain current range	12 years
		b	Parr Timing	Begins 7d earlier	12 years
		c	Smolt Timing	Begins 7-10d earlier	12 years
Life History	2	a	Fry Proportion (Min)	20% Wet yrs 20% Drier yrs	12 years
		b	Parr Proportion (Min)	20% Wet yrs 30% Drier yrs	12 years
		c	Smolt Proportion (Min)	10% Wet yrs 20% Drier yrs	12 years
Productivity	3	a	River Survival** x. Delta Survival = 4.24% **	10-21% 21-42%	9 years
		b	River Survival** x. Delta Survival = 6.22% **	12-25% 25-51%	15 years
		c	River Survival** x. Delta Survival = 10% **	15%-32% 32-65%	24 years

*Ranges reflect different assignment of responsibility between Delta and River systems. Any balance in the range that produces target survival is acceptable (but choosing the low end of each range is not).

** River survival reflects survival from egg to exit from the river system

*** Targets reflect median conditions. Targets for wet and dry years should be specified.

The above table of biocriteria were proposed by a group of NGOs and fish agencies and are intended to include life history traits as well as overall survival. The net survival of a salmon from egg to the ocean would be the product of the river survival and the Delta survival. It is estimated a 4.24% overall survival is needed to achieve the target population size in three generations (9 years). EPA has recommended to the Board that biocriteria similar to these be used to define the term “viable” fish populations included in the narrative water quality standard. Without a definition of this term the narrative criteria is difficult to assess or enforce. EPA is exploring if some subset of these proposed biocriteria might be appropriate for inclusion in a potential promulgation of water quality standards.